

A Fast-Response Atmospheric Turbulence (FRAT) Probe with Gas-Sampling Ducts, Phase II

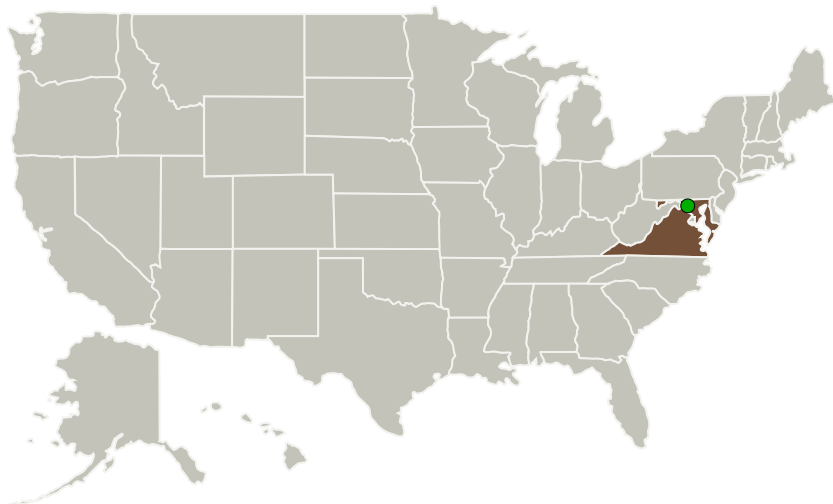
Completed Technology Project (2012 - 2012)



Project Introduction

Aeroprope proposes to design, construct and test an air-data probe with substantially higher frequency response than currently available. This fast-response atmospheric turbulence probe (FRAT probe) will be able to sample ambient air, and measure CO₂ and other gases. Phase I work demonstrated that with a proper design of the probe nose, ingestion holes for gas sampling do not interfere with port pressure measurements. Variations of this probe will be able to operate in harsh atmospheric environments. High-frequency response and resistance to water spray were accommodated by mounting the pressure sensors in small chambers very close to the probe nose surface. To return the absolute instantaneous velocity of air and calculate atmospheric turbulence, the motion of the probe and the aircraft will be measured. To this end, the components of an Attitude Heading Reference System (AHRS), namely accelerometers, magnetometers, GPS and other electronic equipment have been assembled, and tested. These components will be packaged into a stand-alone probe system that will include an A/D board converter and a microcomputer. Software for post-processing of data will be developed. This probe system will be tested on CO₂ towers and mounted on an aircraft to measure gas contents, humidity, and other atmospheric thermodynamic quantities.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

February 2012: Project Start

December 2012: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138721>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

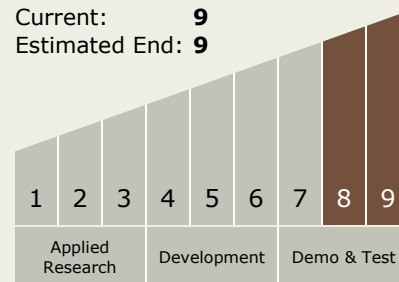
Carlos Torrez

Principal Investigator:

Demetri P Telionis

Technology Maturity (TRL)

Start: **8**
Current: **9**
Estimated End: **9**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - TX08.3 In-Situ Instruments and Sensors
 - TX08.3.1 Field and Particle Detectors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System